

north by anyone else. Quitta is situated 5° N. latitude, and 1° E. longitude.

WALTER HIGGINSON
B. MANNING

Quitta, West Coast Africa, September 25

Two Kinds of Stamens with Different Functions in the same Flower

It may be worth mentioning that cases strongly analogous to those described in NATURE (vol. xxiv. p. 307, and vol. xxvi. p. 386, are also to be observed among the Monocotyledons in the family of Commelynaceæ, and that these cases offer some gradations.

In *Tradescantia virginica*, L., the flowers, as is generally known, are turned upwards and quite regular, the leafy organs of each whorl (3 sepals, 3 petals, 3 outer, 3 inner stamens, 3 united carpels) being alike and equal in size. As Delpino has clearly shown (*Ulteriori osservazioni*, parte ii. fascic. 2, p. 297) these flowers are adapted to Apidæ, which in order to collect pollen take hold of the articulated hairs of the filaments. In some other species here to be considered the adaptation to pollen-collecting bees has remained, but the flowers have turned laterally, and thus not only has their form become irregular (bi-laterally symmetrical or zygomorphous), but also the function of the stamens has gradually changed.

In *Tinnantia undata*, Schlecht. (Fig. 1), sepals and petals are still almost unaltered in form and size, only stamens and pistil have become markedly irregular. The broad roundish petals, which are light purple, spread in a perpendicular plane. The 3 upper stamens, with shorter filaments projecting from

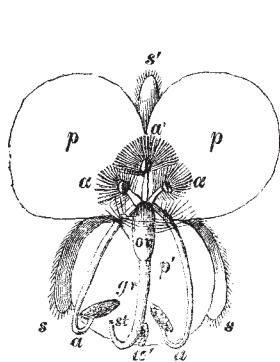


FIG. 1.

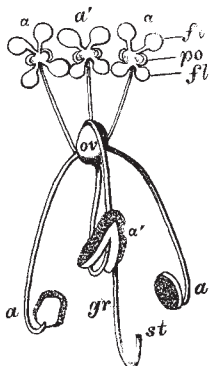


FIG. 2.

FIG. 1.—Front view of the flower of *Tinnantia undata*, Schlecht. FIG. 2.—Front view of the androecium and gynoecium of *Commelina coelestis*, Willd. s, s', s'', sepals; p, p', p'', petals; a, a', a'', outer whorl of anthers; a', a'', a''', inner whorl of anthers, or ovary; gr, style ("Griffel"); st, stigma.

the middle of the flower, are highly conspicuous by a diverging tuft of bright yellow articulated hairs, which on the last third of the light-purple filaments surround the golden yellow anthers like a cone of golden rays. At the tips of these filaments golden yellow pollen-grains are presented by the whole front side of the three upper anthers.

The three lower stamens are much longer, directed obliquely downwards and forwards, with only their tips bending upwards, a little overtopped by the pistil, which has the same direction and incurvation. These parts, like the same parts in the described Melastomaceæ, will hardly be perceived by an advancing insect, "owing to their projection against the broad-petalled corolla of the same colour in the background," for not only the style and the filaments, but also the hairs on the base on the two lateral lower filaments are of the same purple colour as the petals, and even the bluish lower anthers with their yellowish pollen are but feebly conspicuous. Any one of the Apidæ or Syrphidæ of suitable size, however, when making for the upper yellow stamens in order to collect their pollen (I have only once observed the honey-bee doing so), will involuntarily repose on the projecting part, and at first bring the stigma and then the two lateral of the lower anthers into contact with the under-side of its abdomen, and thus regularly effect cross fertilisation.

Here, then, as in *Heeria*, &c., the anthers have differentiated into upper ones, which attract insects and afford food to them, and lower ones which attach their pollen to the visitors, and

cause it to be transported by them to the stigma of the next visited flowers. Also differentiation in the pollen of the two kinds of anthers in our *Tinnantia* has begun to take place, but contrary to *Melastoma*, the pollen-grains of the short stamens here are smaller than those of the longer ones. I measured numerous pollen-grains of two individuals in a moistened state (where they are of elliptical form), and found in the one stem the pollen-grains of the short stamens (in 1-1000 m.m.) 62-75 long, 31-38 broad, those of the longer ones 68-94 long, 38-44 broad; in the other stem, those of the short stamens 53-69 long, 28-37 broad; those of the longer ones 59-78 long, 31-40 broad. Both kinds of pollen proved to be quite fertile.

Commelina coelestis, Willd. (Fig. 2) possesses in general the same contrivances for cross-fertilisation, but has gone a step further in differentiation. Its upper sepal is plainly smaller, its lower petal plainly larger than the two other ones; its upper anthers (a, a', a'') have differentiated in themselves; two small lateral portions of each of them (po) produce a little pollen and four cross-like diverging flaps (fl), which are much larger, attract insects by their bright yellow colour strikingly contrasting with the azure corolla, and perhaps at the same time serve as food to the visitors. The articulated hairs of the filaments thus having lost not only their original function (which they have in all stamens of *Tradescantia*) as supports for the feet of pollen-collecting bees, but also their secondary function (which they have in the upper stamens of *Tinnantia*) of attracting insects, have disappeared altogether. The middlemost of the lower anthers, which in *Tinnantia* is nearly useless from its position behind the style here, has erected and become much larger than the two lateral ones, so as to be eminently useful.

The pollen-production of the upper anthers appears to be vanishing, not only from the diminution of the quantity of produced pollen, but also from the great variability of the size of the pollen grains. For whilst the pollen grains of the two lateral lower anthers only differ in length from 75 to 90, in breadth from 45 to 68, and those of the middlemost lower anther in length from 56 to 82, in breadth from 37 to 56, those of the three upper anthers fluctuate from 50 to 87 length, and from 31 to 56 breadth.

In *Commelina communis*, differentiation has gone still further; the upper sepal and the lower petal are relatively very small; the upper filaments, like the upper petals, are blue-coloured; the lower filaments, like the pistil and the lower petal, are colourless. The upper anthers, as far as I have seen (without microscope) produce no more pollen.

The examination of other species and genera of Commelynaceæ probably would show a longer scale of gradations.

Lippstadt, October 25

HERMANN MÜLLER

A Curious Halo

THERE appeared in NATURE, vol. xxvi. pp. 268, 293, two articles headed "A Curious Halo," which reminded me of an analogous and still more curious phenomenon occurring sometimes here in China, during the hot season. I beg to hand you a few lines on that subject, from the *Monthly Bulletin* of the Zi-ka-wei Observatory for August, 1877:—

"A phenomenon to which I wish to call the attention of meteorologists was observed many times during that month (August), as also in July. It does not seem to take place in Europe, and I am inclined to think that it cannot occur except with an atmosphere over-charged with aqueous vapour, as it is the case with us in July and August. In the evening, just after sunset, or in the morning even long before sunrise, no matter what the direction of the wind and the barometric pressure may be, provided the day or night were very warm, bands of a tint varying from the faintest to the deepest blue are seen to appear upon the whitish or roseate vault of heaven. They usually are first seen in the east at evening and in the west at morning time, seemingly radiating from a common centre diametrically opposite the sun's position. At other times they emerge from the very position of the sun, or from both points at once, the interval being either free from bands or completely encircled by them.

"Last year (1876), on the morning of September 4, I enjoyed a most interesting sight. It was about 5 a.m., the moon, then on her nineteenth day, was above the western horizon, and just being partially eclipsed; now from her bright disc, as from a radiating centre, shot out a number of those bands or blue beams; they traversed the whole expanse of the sky, and seemed to converge towards a point whose situation in the east

below the horizon corresponded with that of the moon in the west above the horizon.

"These bands or shoots are more or less numerous, bright, and persistent; some have been observed in the evening, forty-five minutes after sunset, and in September, 1876, I saw them appear with the first break of day. They are evidently movable in the sky, and there is no doubt that they are due to cumuli floating about the horizon, below or above, through which the light of the sun is sifted and split; they are, in fact, nothing else than the shadows of the clouds in the faint white or rosy tint of the twilight. According as the clouds before the sun are more or less compact or loose, the bands may be blue, white, or red. More than once also have I seen the sky half white and half blue, the separation of the two colours being plainly perceivable, and Venus shining brilliantly in the blue sky close to that limit, whilst it would probably have been almost invisible through the milky sky had by."

Any one who gazes for the first time at this beautiful phenomenon cannot help wondering and acknowledging it to be greatly different from anything to be seen elsewhere. The celebrated Jesuit, Father Bouvet, an old missionary to China, witnessed the phenomenon when on his way from China to Europe as envoy of the great Emperor Kang-hi, in the year 1693; the relation of the voyage (du Halde, vol. i., 1755) gives the following account of his observations:—

"25 Juillet, 1693.—Ce jour-là, environ un quart d'heure avant le lever du soleil, je vis dans le ciel un phénomène que je n'ai jamais vu et dont je n'ai point oui parler en France, quoiqu'il soit fort ordinaire en Orient, surtout à Siam et à la Chine; car je l'ai observé distinctement plus de vingt fois, tantôt le matin, tantôt le soir, dans chacun de ces deux Royaumes, sur mer et sur terre, et même à Péking.

"Ce phénomène n'est autre chose que certains demi-cercles d'ombre et de lumière que paraissent se terminer et s'unir dans deux points opposés du Ciel, savoir d'un côté dans le centre du Soleil, et de l'autre dans le point qui est diamétralement opposé à celui-là. Comme ces demi-cercles sont tous terminés en pointe, tant en Orient qu'en Occident, c'est-à-dire vers les points opposés de leur réunion et qu'ils vont en s'élargissant uniformément vers le milieu du Ciel à mesure qu'ils s'éloignent de l'horizon, ils ne ressemblent pas mal pour leur figure aux *Maisons Célestes*, de la manière dont on les trace sur les Globes, à cela près seulement que ces Zônes d'ombre et de lumière sont ordinairement fort inégales pour la largeur et qu'il arrive souvent qu'il y a de l'interruption entr'elles, surtout lorsque le phénomène n'est pas bien formé.

"Toutes les fois que je l'ai observé, et je l'ai vu quatre fois différentes dans ce voyage en moins de quinze jours, j'ai toujours remarqué que le temps était extrêmement chaud, le ciel chargé de vapeurs, avec une disposition au tonnerre et qu'un gros nuage épais entr'ouvert était vis-à-vis du Soleil. Ce phénomène semble pour la figure fort différent de ces longues traces d'ombre et de lumière qu'on voit souvent le soir et le matin dans le ciel aussi bien en Europe qu'ailleurs et auxquelles leur figure pyramidale a fait donner le nom de *verges*. Si l'on demande pour quelle raison ce phénomène paraît plutôt en Asie qu'en Europe et en été que dans les autres saisons, il me semble qu'on pourrait en attribuer la cause à la nature des terres de l'Asie, qui étant pour la plupart beaucoup plus chargées de nître que celles d'Europe, remplissent l'atmosphère, surtout en été, et lorsque le soleil a plus de force pour les élever, d'exhalaisons nitreuses, lesquelles étant répandues également dans l'air, les rendent plus propres à réfléchir la lumière et par conséquent à former le météore."

The phenomenon described by the old Jesuit astronomer is undoubtedly the same I have witnessed hundreds of times at Zi-ka-Wei. He evidently considers it as different from any hitherto observed atmospheric phenomenon; but his explanation is tainted with the false science of his time. It is quite certain that the phenomenon is due to the atmospheric vapour, but I am rather at a loss to give a more satisfactory explanation. The dispersion of the direct rays of the sun into the minute drops resulting from a partial but wide-spreading condensation of the aqueous vapour in the upper strata of the air, might account for the milky or roseate appearance of the sky at morning and evening time. Besides, the interposition of a light cloud in the way of the sun's rays does not impair the transparency of the drops, and the blue sky may be visible. Now, in the morning and evening the rays of the sun are almost parallel with the horizon; they traverse the whole expanse of the sky, and their apparent convergence on the both sides is only due to the same

optical illusion which shows us the two rails of a railway track or the walls of a tunnel as converging.

Let this explanation be worth what it may, the fact in itself is interesting, and I would beg you, Sir, to notice it in NATURE, dealing, however, with this long communication as you may deem proper.

MARC DECHEVRENS

Zi-ka-Wei Observatory, near Shanghai, (China), August 28

Habits of Scypho-Medusæ

THE communications to NATURE of Mr. Archer (vol. xxiv. p. 307), and of Mr. Alexander Agassiz (vol. xxiv. p. 509), on the subject of Medusæ lying upon the bottom with their tentacles upward, lead me to forward some observations which I made on a similar habit of Medusæ in the island of Simbo, one of the Solomon Islands. The Medusa in question frequents a small mangrove swamp, which lies inclosed in the low point that forms the south shore of the anchorage. Numbers of these animals of a large and dirty-white colour were lying lazily on the mud at the bottom of the water, which varied in depth from one to three feet, with their umbrellas lowermost, and a magnificent mass of arborescent tentacles well displayed. When one of them was disturbed and turned over with a stick, it immediately began to contract the umbrella, until, after swimming a short distance, it resumed its former position on the bottom, of tentacles upward. The dark mud which formed the bottom of the swamp was composed of decayed vegetable matter—low confervoid growths, and a few infusoria and living diatoms. But I invariably observed, after raising several of these Medusæ from the bottom, that a layer of white sand covered over the place where each had lain, its light colour forming a marked contrast with the dark mud around. The form of these patches of sand corresponded with the outline of the animal; but when the Medusa lay in its usual position, the umbrella completely concealed them from view. The sand was sometimes fine, at other times coarse, and was derived from the coral and trachytic rocks in the vicinity, with occasionally fragments of shells intermingled. The sand did not adhere to the surface of the umbrella.

The Medusæ measured generally some eight or nine inches across the umbrella, and appeared to belong to the Rhizostomidae.

H. B. GUPPY

H.M.S. *Lark*, St. Christoval, Solomon Islands, June 29

Prof. Owen on Primitive Man

IN the first number of *Longman's Magazine* Prof. Owen criticises an article of mine on Primitive Man, in the *Fortnightly Review*. In doing so, he quotes some words from my article, which are there given as a quotation from Prof. Schaafhausen. He proceeds to make them the text of his paper, as though the opinions expressed in them were my own. On the question at issue—the Neanderthal skull—I am not competent to form any personal opinion; I merely abstracted the opinions of Rolleston and Schaafhausen. Prof. Owen would hardly have spoken in the same lofty magisterial tone had he attributed those opinions to their real authors, whose reputation can take care of itself. The respect I feel for Prof. Owen's work makes me deeply regret the necessity for this explanation; but I cannot allow him to quote as mine words which I placed between inverted commas, attributing them at the same time to their real author.

GRANT ALLEN

Magnetic Arrangement of Clouds

THERE is a curious arrangement of clouds which, though seen myself for the first time this year, may doubtless have been observed by others, though I have never seen it referred to anywhere. Light clouds of the cirrus formation apparently at great elevations range themselves round two poles—one about in the direction of the magnetic north pole, and the other in that of the south. The space between the two poles is filled more or less completely by wispy cirri. The exact point where the various threads or wisps should form themselves into a pole I have never been able to clearly see, owing to the dense stratum of vapour which even on the clearest day accumulates at the horizon. On Sunday, October 29, the arrangement above noticed was remarkably distinct in the afternoon.

C. H. ROMANES

Worthing